CLAIMS

1. A pressure fluid operated impact device comprising a frame (2) whereto a tool (3) is mountable movably in its longitudinal direction, control means (7) for controlling pressure fluid feed by the impact device (1), and means for generating a stress impulse in the tool by means of the pressure of a pressure fluid, **characterized** in that

the impact device (1) comprises a working chamber (8) entirely filled with pressure fluid and, in the working chamber (8), a transmission piston (9) movably mounted in the longitudinal direction of the tool (3) with respect to the frame (2), an end of the transmission piston facing the tool (3) coming into contact with the tool (3) either directly or indirectly at least during the generation of the stress pulse, the transmission piston, in its axial direction with respect to the tool (3) on the opposite side thereof, being provided with a pressure surface (9a) located towards the working chamber (8),

the impact device (1) comprises energy charging means for charging energy of the pressure fluid to be fed to the impact device necessary for generating the stress pulse, and in that

the control means are coupled to allow periodically alternately a pressure fluid having a pressure higher than the pressure of the pressure fluid present in the working chamber (8) to flow to the working chamber (8), thus causing a sudden increase in the pressure in the working chamber (8) and, consequently, a force pushing the transmission piston (9) in the direction of the tool (3), compressing the tool (3) in the longitudinal direction and thus generating a stress pulse in the tool (3), the generation of the stress pulse ending substantially at the same time as the influence of the force on the tool (3) ends, and, correspondingly, to discharge pressure fluid from the working chamber (8) in order to enable the transmission piston (9) to return to its substantially original position.

2. An impact device as claimed in claim 1, **characterized** in that in order to stop the influence of the force, the control means are coupled to prevent pressure fluid from entering the working chamber (8).

3. An impact device as claimed in claim 1, **characterized** in that the control means are coupled to stop the influence of the force by discharging pressure fluid from the working chamber (8).

4. An impact device as claimed in claim 1, **characterized** in that it comprises stop elements for stopping the movement of the transmission piston (9) in the direction of the tool (3) such that the influence of the force on the tool ends.

5. An impact device as claimed in any one of the preceding claims, **characterized** in that the impact device (1), as an energy charging means, comprises an energy charging space (4) which is entirely filled with pressurized pressure fluid and whose volume is substantially large as compared with the volume of a pressure fluid amount to be fed to the working chamber (8) during the generation of one stress pulse.

6. An impact device as claimed in claim 5, **characterized** in that when the impact device is in operation, pressure fluid is fed to the energy charging space (4) such that a predetermined pressure level is maintained in the energy charging space (4), and that the control means are coupled to allow periodically alternately pressure fluid to flow from the energy charging space (4) to the working chamber (8) and, consequently, to close the connection between the energy charging space (4) and the working chamber (8).

7. An impact device as claimed in claim 1 or 2, **characterized** in that the control means comprise a rotating control valve (7) comprising a plurality of successive openings in the direction of rotation thereof in order to feed pressure fluid from the energy charging space (4) via a plurality of feed channels (4a) to the working chamber (8) simultaneously.

8. An impact device as claimed in claim 7, **characterized** in that the length and cross-section of each feed channel (4a) are mutually the same.

9. An impact device as claimed in any one of claims 1 to 7, **characterized** in that it comprises at least two feed channels (4a1, 4a2) which differ in length and/or cross-sectional area and which lead from the energy charging space to the working chamber (8).

10. An impact device as claimed in claim 9, **characterized** in that it comprises at least one valve to activate and deactivate the feed channels (4a1, 4a2) differing in length and/or cross-sectional area.

11. An impact device as claimed in any one of the preceding claims, **characterized** in that the length of at least one feed channel (4a; 4a1, 4a2) from the energy charging space (4) to the working chamber (8) is adjustable.

12. An impact device as claimed in any one of claims 5 to 11, **characterized** in that the energy charging space (4) is a tank whose walls, due to the influence of pressure, yield such that the volume of the energy charging space increases as pressure increases.

13. An impact device as claimed in any one of claims 5 to 12, **characterized** in that the energy charging space (4) is a tank separate from the frame (2).

14. An impact device as claimed in any one of claims 5 to 13, **characterized** in that at least one energy charging space (4) is a hydraulic accumulator.

15. An impact device as claimed in any one of the preceding claims, **characterized** in that the transmission piston (9) is a membrane type piston.

16. An impact device as claimed in any one of the preceding claims, **characterized** in that the feed force of the impact device is used for pushing the transmission piston (9) back to its pre-stress-pulse position.

17. An impact device as claimed in any one of the preceding claims, **characterized** in that it comprises means for returning the transmission piston (9) after an impact to its pre-impact position with respect to the impact device by bringing a separate force acting between the impact device (1) and the transmission piston (9) to influence the transmission piston (9), the force pushing the transmission piston (9) towards the working chamber (8).

18. An impact device as claimed in any one of the preceding claims, **characterized** in that the length of movement of the transmission piston (9) in the working chamber (8) is some millimetres.

19. A method of generating a stress pulse in a pressure fluid operated impact device as claimed in claim 1, **characterized** in that a pressure fluid having a pressure higher than the pressure of the pressure fluid present in the working chamber (8) is fed to a working chamber of the impact device (1), the working chamber being entirely filled with pressure fluid, which, as a result of a sudden increase in the pressure in the working chamber (8) produces a force pushing the transmission piston (9) in the direction of the tool (3), compressing the tool (3) in the longitudinal direction and thus generating a stress pulse in the tool (3), the generation of the stress pulse ending substantially at the same time as the influence of the force on the tool (3) ends, and, correspondingly, to discharge pressure fluid from the working chamber (8) in

order to enable the transmission piston (9) to return to its substantially original position.

20. A method as claimed in claim 19, **characterized** in that as an energy charging means, an energy charging space (4) which is entirely filled with pressurized pressure fluid and whose volume is substantially large as compared with the volume of a pressure fluid amount to be fed to the working chamber (8) during the generation of one stress pulse.

21. A method as claimed in claim 20, **characterized** in that when the impact device (1) is in operation, pressure fluid is fed to the energy charging space (4) such that a predetermined pressure level is maintained in the energy charging space (4), and that the control means are coupled to allow periodically alternately pressure fluid to flow from the energy charging space (4) to the working chamber (8) and, consequently, to close the connection between the energy charging space (4) and the working chamber (8).

22. A method as claimed in any one of claims 19 to 21, **characterized** in that a rotating control valve (7) is used as a control means, comprising a plurality of successive openings in the direction of rotation thereof in order to feed pressure fluid from the energy charging space (4) via a plurality of feed channels (4a) to the working chamber (8) simultaneously.

23. A method as claimed in any one of claims 19 to 22, **characterized** in that pressure fluid is fed from the energy charging space (4) to the working chamber (8) via at least two feed channels (4a) which are mutually the same in length and/or cross-sectional area.

24. A method as claimed in any one of claims 19 to 23, **characterized** in that pressure fluid is fed from the energy charging space (4) to the working chamber (8) via at least two feed channels (4a) which differ in length and/or cross-sectional area.

25. A method as claimed in claim 24, **characterized** in that for adjustment of properties of a stress signal, feed channels (4a1, 4a2) which differ in length and/or cross-sectional area are activated and deactivated.

26. A method as claimed in any one of claims 19 to 25, **characterized** in that the length of at least one feed channel (4a; 4a1, 4a2) from the energy charging space (4) to the working chamber (8) is adjustable.

27. A method as claimed in any one of claims 19 to 26, **characterized** in that as the energy charging space (4), a tank is used whose

walls, due to the influence of pressure, yield such that the volume of the energy charging space increases as pressure increases.

28. A method as claimed in any one of claims 19 to 27, **characterized** in that as the energy charging space (4), a tank separate from the frame (2) is used.

29. A method as claimed in any one of claims 19 to 28, **characterized** in that as at least one energy charging space (4), a hydraulic accumulator is used.

30. A method as claimed in any one of claims 19 to 29, **characterized** in that as the transmission piston (9), a membrane type piston is used.

31. A method as claimed in any one of claims 19 to 30, **characterized** in that the transmission piston (9) is pushed back to its pre-stress-pulse position by using the feed force of the impact device (1).

32. A method as claimed in any one of claims 19 to 30, **characterized** in that for returning the transmission piston (9) after an impact to its pre-impact position with respect to the impact device, a separate force acting between the impact device (1) and the transmission piston (9) is arranged to influence the transmission piston (9), the force pushing the transmission piston (9) towards the working chamber (8).

33. A method as claimed in any one of claims 19 to 32, **characterized** in that when generating a stress pulse, the transmission piston (9) is moved for some millimetres in the working chamber (8).